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<b>(54) Title:</b> ABSORBENT ARTICLE WITH FINGER POCKETS			
<b>(57) Abstract</b>			
<p>An absorbent article including a liquid permeable topsheet, a liquid impermeable backsheet joined with the topsheet and an absorbent core located between the topsheet and the backsheet. The absorbent article also includes a finger pocket located on the backsheet. The finger pocket includes a fixed portion joined to the backsheet and the free portion is preferably free to move away from the backsheet to provide an opening. A diaper may slide a finger into the opening for controlling at least a portion of the absorbent article while the diaper is being fitted to or removed from a wearer.</p>			

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## ABSORBENT ARTICLE WITH FINGER POCKETS

### FIELD OF THE INVENTION

The present invention relates to absorbent garments having finger pockets and, more particularly, to disposable absorbent garments such as diapers having finger pockets or loops to aid in fitting the garment about a wearer.

### BACKGROUND OF THE INVENTION

Infants and incontinent individuals often wear absorbent articles such as diapers to receive and contain urine and other bodily exudates. Absorbent articles function both to contain the discharged materials and to isolate the materials from bedding and clothing. Disposable absorbent articles having many different designs are known in the art. For example, U.S. Patent No. Re. 26,152 entitled "Disposable Diaper" issued to Duncan and Baker on January 31, 1967 describes a disposable diaper which has achieved wide acceptance and commercial success. U.S. Patent No. 3,863,003 entitled "Contractable Side Portions For Disposable Diaper" issued to Buell on Jan. 14, 1975 and U.S. Pat. No. 5,151,092 entitled "Absorbent Article With Dynamic Elastic Waist Feature Having A Predisposed Resilient Flexural Hinge" issued to Buell et al. on Sept. 29, 1992 describe improved disposable diapers which have achieved commercial success.

Despite the improvements that have been made in relation to absorbent garments, such garments are often difficult to properly secure about the wearer. Proper securement is a problem especially if the wearer is moving or if the wearer is fitting the article to him or herself. In such cases, only one hand may be available to both hold the garment about the wearer and to fasten the garment. Further, wearer's fitting the garment to themselves may find the orientation of the fastening system awkward and that their physical limitations make the garment almost impossible to don without help. Thus, it would be advantageous to provide an absorbent article having an improved structure which helps reduce the difficulty associated with properly fitting the garment to the wearer.

Therefore, it is an object of the present invention to provide absorbent articles with structure which may be more easily fit to the wearer.

It is another object of the present invention to provide absorbent articles with finger loops or pockets which may reduce the difficulty associated with fitting such garments to the wearer.

It is yet another object of the present invention to provide disposable absorbent articles, such as diapers, with low cost means for reducing the difficulty associated with fitting such garments to the wearer.

These and other objects of the present invention will be more readily apparent when considered with reference to the following descriptions and when taken in connection with the accompanying drawings.

### SUMMARY OF THE INVENTION

The present invention is directed to an absorbent article having a front waist region, a rear waist region, a crotch region located between the front waist region and the rear waist region, a longitudinal centerline, a lateral centerline, a pair of opposed end edges and a pair of longitudinal edges running between the end edges generally parallel to the longitudinal centerline. The absorbent article preferably includes a liquid permeable topsheet, a liquid impermeable backsheet joined with the topsheet and an absorbent core located between the topsheet and the backsheet. The backsheet has a body surface adjacent at least a portion of the absorbent core and an opposing garment surface. A finger pocket is located on the garment surface of the backsheet, the finger pocket including a fixed portion and a free portion. The fixed portion is preferably joined to the backsheet and the free portion is preferably free to move away from the backsheet to provide an opening into which a diaperer may slide a finger for controlling at least a portion of the absorbent article while the diaper is being fitted to or removed from a wearer.

### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a plan view of an absorbent article including one embodiment of the finger pockets of the present invention;

Figure 2 is a perspective view of one embodiment of an absorbent article including the finger pockets of the present invention;

Figure 3 is a perspective view of one embodiment of an absorbent article including an alternative embodiment of the finger pockets of the present invention;

Figure 4 is a perspective view of one embodiment of an absorbent article including an alternative embodiment of the finger pockets of the present invention;

Figure 5 is a perspective view of one embodiment of an absorbent article including an alternative embodiment of the finger pockets of the present invention;

Figure 6 is a perspective view of one embodiment of an absorbent article including an alternative embodiment of the finger pockets of the present invention;

Figure 7 is a perspective view of one embodiment of an article of clothing including an alternative embodiment of the finger pockets of the present invention;

Figure 8 is a perspective view of one method for making one embodiment of the finger pockets of the present invention;

Figure 9 is a perspective view of one method of making an alternative embodiment of the finger pockets of the present invention; and

Figure 10 is a perspective view of one embodiment of the present invention showing the diaperer's hand as the garment is being fitted to a wearer.

#### DETAILED DESCRIPTION OF THE INVENTION

As used herein the term "absorbent article" refers to articles which absorb and contain body exudates and more specifically refers to articles which are placed against or in proximity to the body of the wearer to absorb and contain various exudates discharged from the body. Absorbent articles are typically differentiated by whether they are reusable or disposable. "Disposable" refers to articles which are generally intended to be discarded after a single use (i.e., they are not generally intended to be laundered or otherwise restored or reused). The absorbent articles of the present invention are preferably disposable absorbent articles. The absorbent articles may be further defined by whether they are "unitary" such that they do not require a separate manipulative parts or whether they comprise an element of a diaper system such as a separate holder and liner. The absorbent articles of the present invention are preferably unitary. One preferred embodiment of a unitary disposable absorbent article of the present invention, diaper 20, is shown in FIG. 1. As used herein, the term "diaper" refers to a garment generally worn by infants and/or incontinent persons about the lower torso to receive and contain bodily exudates. It should be understood, however, that the present invention is also applicable to other disposable absorbent articles such as incontinence briefs, undergarment absorbent inserts, disposable training pants, belted diapers, diaper holders, sanitary napkins and the like, as well as articles of clothing or other articles to be fitted to wearers.

Figure 1 is a plan view of one embodiment of a diaper 20 in its flat out, uncontracted state (i.e., without any elastic induced contraction pulled out) with portions of the structure being cut away to more clearly show the underlying structure of the diaper 20 and with the portion of the diaper 20 which contacts the wearer facing away from the viewer. The diaper 20 is shown to have a front waist region 36, a rear waist region 38, and a crotch region 37 located between the front waist region 36 and the rear waist region 38. The waist regions generally comprise those portions of the diaper 20

which, when worn, encircle the waist of the wearer. The waist regions may include an elastic element or other means for gathering or for permitting extension about the waist of the wearer to improve fit and containment. The crotch region 37 is that portion of the diaper 20 positioned between the front waist region 36 and the rear waist region 38 which, when the diaper 20 is worn, is generally positioned between the legs of the wearer.

The diaper 20 preferably comprises a liquid pervious topsheet 22, a liquid impervious backsheet 24 and an absorbent core 26 which is preferably located between the topsheet 22 and the backsheet 24. The absorbent core 26 preferably has a garment surface which generally faces away from the wearer and a body surface which generally faces the wearer. The diaper 20 preferably also includes at least one finger pocket 50 which may be used to help fit the diaper 20 to the wearer. The diaper 20 may also include such other features as are known in the art including leg cuffs 28, front and rear ear panels 30, waist features 32, elastics and the like to provide better fit, containment and aesthetic characteristics. Such additional features are well known in the art and are described in U.S. Pat. No. 3,860,003 entitled "Contractable Side Portions For Disposable Diaper" issued to Buell on Jan. 14, 1975 and U.S. Pat. No. 5,151,092 entitled "Absorbent Article With Dynamic Elastic Waist Feature Having A Predisposed Resilient Flexural Hinge" issued to Buell et al. on Sept. 29, 1992. Each of these patents is incorporated by reference herein.

In a preferred embodiment of the diaper 20 in which the backsheet 24 has length and width dimensions generally larger than those of the absorbent core 26, the backsheet 24 extends beyond the edges of the absorbent core 26 to thereby form the periphery of the absorbent article. The periphery defines the outer perimeter, in other words, the edges of the diaper 20. The periphery comprises the longitudinal edges 42 and the end edges 44. As shown in FIG. 1, the topsheet 22 may be coterminous with the backsheet 24 along the end edges 44 as well as the longitudinal edges 42 of the diaper 20.

The absorbent core 26 may be any absorbent material which is generally compressible, conformable, non-irritating to the wearer's skin, and capable of absorbing and retaining liquids and certain body exudates. The absorbent core 26 may be manufactured in a wide variety of sizes and shapes (e.g., rectangular, hour-glass, asymmetric, etc.) and from a wide variety of liquid absorbent materials commonly used in disposable diapers and other absorbent articles, such as comminuted wood pulp, which is generally referred to as airfelt. Examples of other suitable absorbent materials include creped cellulose wadding, absorbent foams, absorbent sponges, superabsorbent polymers, absorbent gelling materials, or any equivalent materials or combination of

materials. The total absorbent capacity of the absorbent core 26 should be compatible with the intended use of the diaper 20. Further, the absorbent capacity and configuration of the absorbent core 26 may be varied to accommodate wearers ranging from infants through adults (e.g., the absorbent core may have a varying caliper, or hydrophilic gradient, a capillary differential, low density zones, or may or may not contain absorbent gelling materials).

The absorbent core 26 may comprise a layer of absorbent material comprising hydrophilic fibers and particles of absorbent gelling material (hydrogel) such as the absorbent structure described in U.S. Patent 4,610,678 entitled "High-Density Absorbent Structure" which issued to Paul T. Weisman and Steven A. Goldman on September 9, 1986 and which patent is incorporated herein by reference. Preferred embodiments of the absorbent core 26 are generally described in U.S. Patent No. 5,234,423 entitled "Absorbent Article With Elastic Waist Feature and Enhanced Absorbency", issued to Alemany et al. on August 10, 1993; and U.S. Patent No. 5,217,445 entitled "Absorbent Structures Containing Superabsorbent Material and Web of Wetlaid Stiffened Fibers" issued to Young et al. on June 8, 1993, which are incorporated herein by reference. Other exemplary absorbent cores useful in the present invention are described in U.S. Patent No. 5,124,188 entitled "Porous, Absorbent, Polymeric Macrostructures and Methods of Making the Same", issued to Roe et al., on June 23, 1992; U.S. Patent No. 5,137,537 entitled "Absorbent Structure Containing Individualized, Polycarboxylic Acid Crosslinked Wood Pulp Cellulose Fibers", issued to Herron et al., on August 11, 1992; U.S. Patent No. 5,180,622 entitled "Absorbent Members Containing Interparticle Crosslinked Aggregates", issued to Berg, et al., on January 19, 1993; U.S. Patent 5,260,345 entitled "Absorbent Foam Materials for Aqueous Body Fluids and Absorbent Articles Containing Such Materials" issued to DesMarais et al., on November 9, 1993; U.S. Patent 4,673,402 entitled "Absorbent Article With Dual-Layered Cores" which issued to Paul T. Weisman, Dawn I. Houghton and Dale A. Gellert on June 16; and PCT Publication No. WO 92/11830, published on July 23, 1992, entitled "Absorbent Article Having Rapid Acquiring, Multiple Layer Absorbent Core". All of these patents and publications are hereby incorporated herein by reference.

The topsheet 22 is preferably compliant, soft feeling, and non-irritating to the wearer's skin. Further, the topsheet 22 is preferably liquid pervious permitting liquids to readily penetrate through its thickness. A suitable topsheet 22 may be manufactured from a wide range of materials, such as porous foams, reticulated foams, formed films, apertured plastic films, natural fibers (e.g., wood or cotton fibers), synthetic fibers (e.g., polyester or polypropylene fibers) or from a combination of natural and synthetic fibers.

There are a number of manufacturing techniques which may be used to manufacture the topsheet 22. For example, the topsheet 22 may be woven, non-woven, spunbonded, carded, or the like. One preferred topsheet 22 comprises polypropylene fibers having a denier of about 2.2, such as P-8, manufactured by Veratec, Inc., a Division of the International Paper Company, of Walpole, Massachusetts. A preferred topsheet 22 is carded, and thermally bonded by means well known to those skilled in the fabrics art.

Preferably, the topsheet 22 is made of a hydrophobic material to isolate the wearer's skin from liquids in the absorbent core 26. If the topsheet 22 is made of a hydrophobic material, at least the upper surface of the topsheet 22 is treated to be hydrophilic so that liquids will transfer through the topsheet 22 more rapidly. This diminishes the likelihood that body exudates will flow off the topsheet 22 rather than being drawn through the topsheet 22 and being absorbed by the absorbent core 26. The topsheet 22 can be rendered hydrophilic by treating it with a surfactant including spraying the topsheet 22 material with a surfactant or immersing the material into the surfactant. A more detailed discussion of such a treatment is contained in U.S. Patents 4,988,344 entitled "Absorbent Articles with Multiple Layer Absorbent Layers" issued to Reising et al., on January 29, 1991, and U.S. Patent 4,988,345 entitled "Absorbent Articles with Rapid Acquiring Absorbent Cores" issued to Reising on January 29, 1991, each of which is incorporated herein by reference.

The topsheet 22 and the backsheet 24 may be joined together in any suitable manner as is well known in the diaper manufacturing art. As used herein, the term "joined" encompasses configurations whereby elements of the diaper 20 are connected to each other either directly or indirectly. Thus, the topsheet 22 may be directly joined to the backsheet 24 by affixing the topsheet 22 to the backsheet 24 itself or may be indirectly joined to the backsheet 24 by affixing the topsheet 22 to intermediate members which in turn are affixed to the backsheet 24. In a preferred embodiment, the topsheet 22 and the backsheet 24 are joined directly to each other in the diaper periphery by an adhesive or any other attachment means as is known in the art. Alternative suitable attachment means are discussed below with regard to the backsheet 24.

The backsheet 24 is preferably positioned adjacent the garment surface of the absorbent core 26 that faces away from the wearer and is preferably secured thereto by attachment means such as those well known in the art. For example, the backsheet 24 may be secured to the absorbent core 26 by a uniform continuous layer of adhesive, a patterned layer of adhesive, or an array of separate lines or spots of adhesive. Alternatively, the attachment means may comprise heat bonds, pressure bonds, ultrasonic bonds, dynamic mechanical bonds, or any other suitable attachment means or

combinations of these attachment means as are known in the art. An adhesive which has been found to be satisfactory is manufactured by H. B. Fuller Company of St. Paul Minn. and marketed as HL-1258. The core attachment means preferably comprise an open pattern network of filaments of adhesive as is shown in U.S. Patent 4,573,986 entitled "Disposable Waste-Containment Garment" which issued to J. A. Minetola and David R. Tucker on March 4, 1986, and which is incorporated herein by reference. An exemplary attachment means of an open pattern network of filaments comprises several lines of adhesive filaments swirled into a pattern such as is illustrated by the apparatus and methods shown in U.S. Patent No. 3,911,173 issued to Sprague, Jr. on Oct. 7, 1975; U.S. Patent No. 4,785,996 issued to Zieckler, et al. on Nov. 22, 1978; and U.S. Patent No. 4,842,666 issued to Werenicz on June 27, 1989. Each of these patents are incorporated herein by reference.

Figures 2-9 show examples of preferred embodiments of the present invention. In each case, garment 20 includes at least one finger pocket 50. The finger pocket 50 is useful in reducing the difficulty associated with fitting garments, such as disposable absorbent garments, to wearers. A person fitting the garment 20 to the wearer, whether it is the wearer himself or another, may use the finger pockets 50 to help control a portion or portions of the garment 20 while initially fitting the garment to the wearer, in fastening or refastening the closure system of the garment or when removing the garment from the wearer. In any case, the person donning the garment 20 may slide one or more fingers into the finger pocket(s) 50. When in the pockets 50, the fingers are generally better able to control the surrounding portions of the garment 20 and more easily position the garment 20 about the wearer. Such positive control may be especially useful in cases where the wearer is moving or in cases where the garment 20 is being fitted to the wearer by him or herself.

In Figure 2, one preferred absorbent article embodiment of the present invention is shown. (Although the term "absorbent article" is used to describe many of the embodiments herein, such embodiments are not intended to limit the invention to absorbent or disposable absorbent articles. For instance, it is contemplated that many of the embodiments described may be useful as diaper covers or the like which may not be intended to absorb bodily exudates.) The absorbent article 20 preferably includes two finger pockets 50, disposed adjacent the end edge 44 of the diaper 20 along each longitudinal edge 42. The finger pockets 50 are preferably located on the garment surface 48 of the backsheet 24 in the front waist region 36. Each finger pocket 50 preferably includes a fixed portion 52 which is joined with the backsheet 24 and a free

portion 54. The free portion 54 is capable of moving away from the backsheet 24, thus providing an opening 56 into which the diaperer may slide one or more fingers.

The finger pockets 50 may be integral with the diaper 20 or separate members attached thereto. Further, the finger pockets 50 may take on any size or shape so long as the finger pocket may be provided in a configuration that permits at least one finger to slide into its opening 56. In one preferred embodiment, the finger pocket 50 includes a generally rectangular member having opposed fixed portions 52 and an intermediate free portion 54, as shown in Figure 4. Alternatively, the finger pocket 50 may include a generally rectangular member having three sides closed or joined to the backsheet 22, as shown in Figure 2. In yet another embodiment, the finger pocket 50 includes a generally triangular member wherein at least a portion of two of the three sides are fixed and at least a portion of the third side is free to form the opening 56.

The number of finger pockets 50 included in any single article or garment may be varied. For instance, in the preferred embodiment shown in Figures 2, 3, 5, 6 and 8, two finger pockets 50 are shown. In Figure 6, a single finger pocket 50 is shown and in Figure 4, four finger pockets 50 are shown. Further, in absorbent articles, such as diapers, finger pockets 50 may be located on any surface of the garment 20 in the front waist region 36, the rear waist region 38 or the crotch region 37.

If the finger pocket 50 is a separate element attached to the diaper 20, it may be joined to the diaper 20 by any means known in the art. For example, the fixed portion 52 of the finger pocket 50 may be joined to the diaper 20 by continuous or intermittent bonds of adhesive, thermal or ultrasonic bonds, or other mechanical joining means such as rivets, staples, hook and loop type fasteners, and the like. (As used herein the term "intermittent" refers to bonds which are broken or discontinuous. The term "continuous" refers to bonds which are neither broken nor discontinuous.)

An alternative embodiment of the present invention, which is shown in Figure 6, includes finger pockets 50 which are integral with the backsheet 24. In Figure 6, the finger pockets 50 includes a slit 58 in the backsheet 24. The slit 58 has fixed portions 52 at either end and an open portion 54 intermediate the fixed portion 52. The free portion 54 provides an opening 56 through which the diaperer may slide one or more fingers. Although a particular slit length and orientation is shown in Figure 6, any size, shape, orientation, or number of slits may be used to provide the finger pocket 50 of the present invention. If the backsheet 24 is a laminate of more than one lamina, the slit 58 may pass through any or all of the layers. Additional integral finger pockets 50 may be provided by pleating or folding selected portions of the absorbent article 20.

Examples of folded integral finger pockets 50 are shown in Figures 8 and 9. In Figure 8, the garment 20 includes ear flaps 60 located in the front waist region 36 which expands laterally outwardly from adjacent the absorbent core 26. The ear flaps 60 each include a proximal edge 62 located generally adjacent the absorbent core 26 and a distal edge 64 which is located laterally outwardly from the proximal edge when the ear flaps 60 are in an open, unfolded configuration (shown in dotted lines). To provide finger pockets 50, the ear flaps 60 are folded inwardly over at least a portion of the backsheet 24 and joined thereto in the fixed portion(s) 52. The size and shape of the finger pockets 50 and the location of the fixed portion(s) 52 may be varied as desired.

Figure 9 shows an embodiment of the present invention including an integral finger pocket 50. The finger pocket 50 is formed by folding the end edge 44 of the article 20 longitudinally inwardly over the backsheet 24. One or more fixed portions 52 are joined with the underlying structure of the article 20. As shown, the finger pocket 50 created in such configurations is relatively large and may have an opening 56 which is large enough to accept more than one of the diaperers fingers. In other embodiments, the end edge 44 in the rear waist region 38 may be folded to form a different finger pocket 50.

Figure 7 shows an alternative embodiment of the present invention included in a garment such as a shirt or robe. The finger pockets 50 may be located anywhere on the garment to provide easier fitting or removal of the garment. For example, the finger pockets 50 may be located along the front opening of a shirt. In combination with mechanical fasteners such as hook and loop type fasteners, such garments may be easily donned on or removed by those with limited physical capacities in their hands or arms. Of course, any type of garment may include such finger pockets 50 and they may be useful with many different types of fastening devices.

Diaper and diaper cover embodiments of the present invention are preferably fitted to the wearer as follows. The diaper or diaper cover is placed flat on a surface and the wearer is positioned on the topsheet of the article such that the wearer's back is adjacent the rear waist region 38 of the diaper 20. The front waist region 36 is then pulled through the wearer's legs and positioned across the front waist of the wearer. The diaperer may slide one or more fingers into any of the finger pockets 50 to help properly position the diaper for fastening. The finger pockets 50 may be especially useful if the wearer is moving at the time of diapering. The diaperer's hand can be used not only to position the diaper, but can be used to maintain control of the wearer, as shown in Figure 10.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

WHAT IS CLAIMED IS:

1. An absorbent article having a front waist region, a rear waist region, a crotch region located between said front waist region and said rear waist region, a longitudinal centerline, a lateral centerline, a pair of opposed end edges and a pair of longitudinal edges running between said end edges generally parallel to said longitudinal centerline; the absorbent article comprising:
  - a liquid permeable topsheet;
  - a liquid impermeable backsheet joined with said topsheet, said backsheet having a body surface adjacent at least a portion of said absorbent core and an opposing garment surface;
  - an absorbent core located between said topsheet and said backsheet; and
  - the absorbent article characterized by a finger pocket located on said garment surface of said backsheet, said finger pocket including a fixed portion and a free portion, said fixed portion joined to said backsheet and said free portion free to move away from said backsheet to provide an opening into which a diaperer may slide a finger for controlling at least a portion of said absorbent article while said diaper is being fitted to or removed from a wearer.
2. The absorbent article of Claim 1 wherein said finger pocket includes a generally rectangular member having opposed fixed portions and an intermediate free portion.
3. The absorbent article of Claim 1 wherein said finger pocket includes a generally triangular member having three sides, said triangular member being joined to said backsheet adjacent at least a portion of two of said three sides.
4. The absorbent article of Claim 1 wherein said finger pocket includes a pleat formed in said backsheet.
5. The absorbent article of Claim 1 wherein said finger pocket is formed from a front ear flap which extends laterally outwardly from said absorbent core in said front waist region, said front ear flap having a proximal edge disposed adjacent said absorbent core and a distal edge spaced laterally outwardly from said

proximal edge, said distal edge of said front ear flap being folded laterally inwardly over at least a portion of said backsheet to form said finger pocket.

6. The absorbent article of Claim 1 wherein said backsheet includes a slit forming said finger pocket.
7. A diaper cover having a front waist region, a rear waist region, a crotch region located between said front waist region and said rear waist region, a longitudinal centerline, a lateral centerline, a pair of opposed end edges and a pair of longitudinal edges running between said end edges generally parallel to said longitudinal centerline; the absorbent article comprising a liquid impermeable backsheet having a body surface and an opposing garment surface; and  
the diaper cover characterized by a finger pocket located on said garment surface of said backsheet, said finger pocket including a fixed portion and a free portion, said fixed portion joined to said backsheet and said free portion free to move away from said backsheet to provide an opening into which a diaperer may slide a finger for controlling at least a portion of the diaper cover while the diaper cover is being fitted about a wearer.
8. The absorbent article of any of the preceding claims comprising a single finger pocket adjacent said end edge located in said front waist region.
9. The absorbent article of any of the preceding claims comprising two finger pockets, one of said finger pockets located adjacent each said longitudinal edge in said front waist region.

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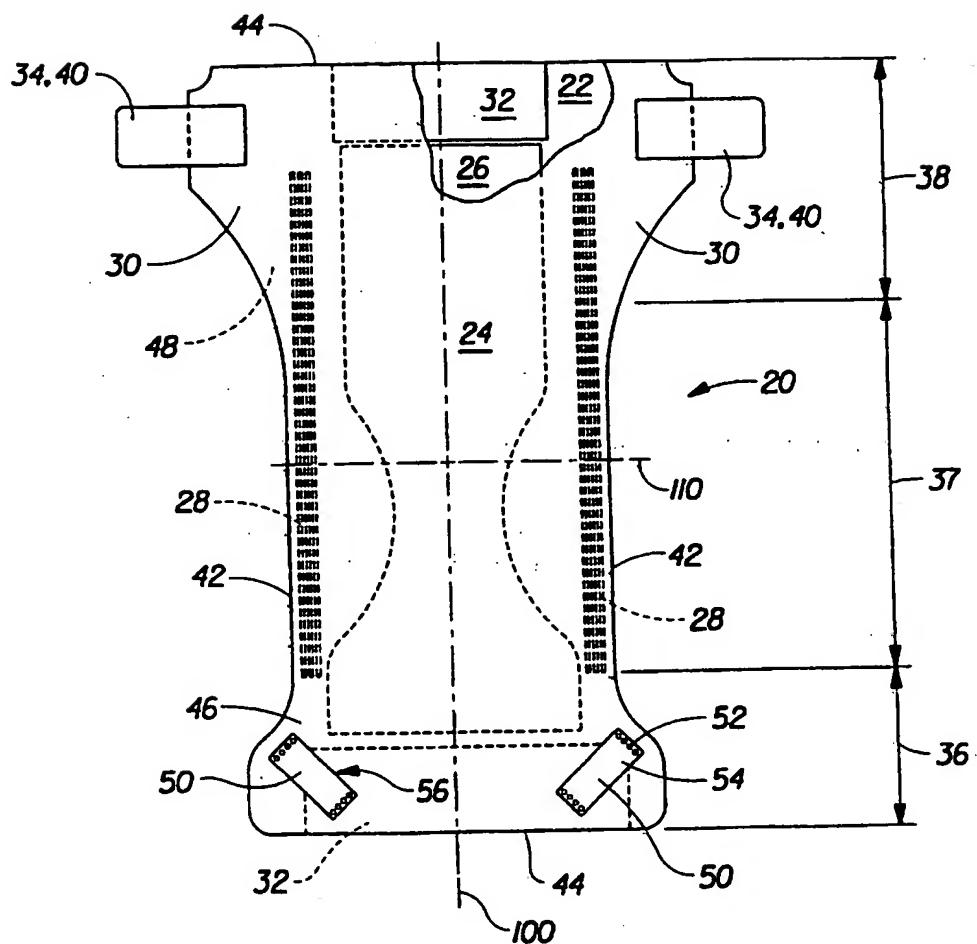
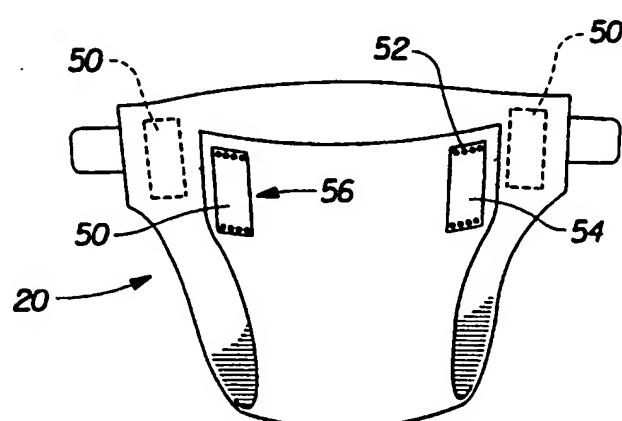
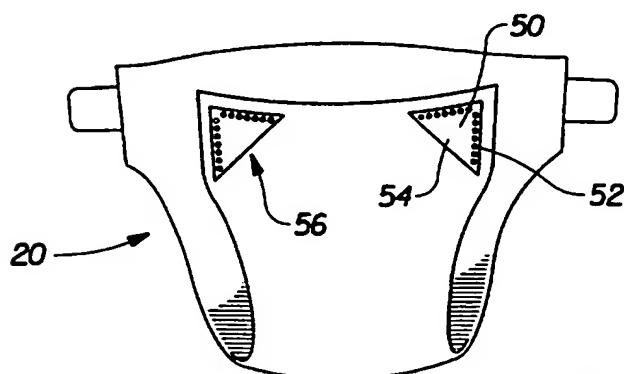
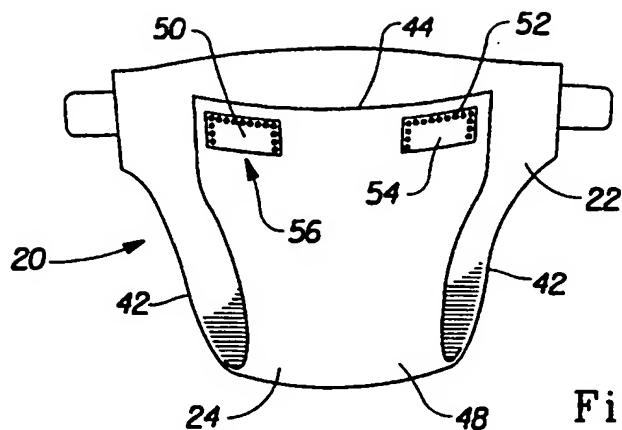


Fig. 1

2/4



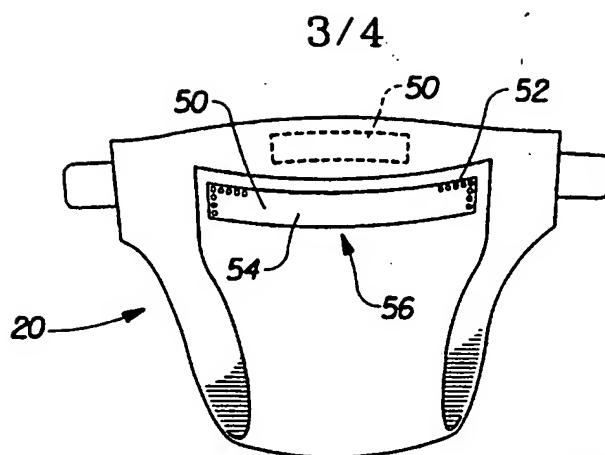


Fig. 5

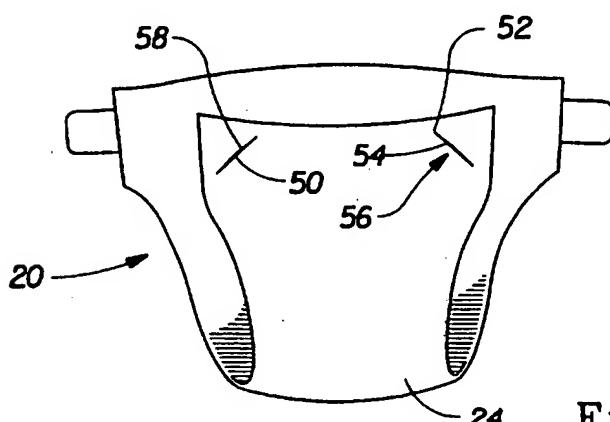


Fig. 6

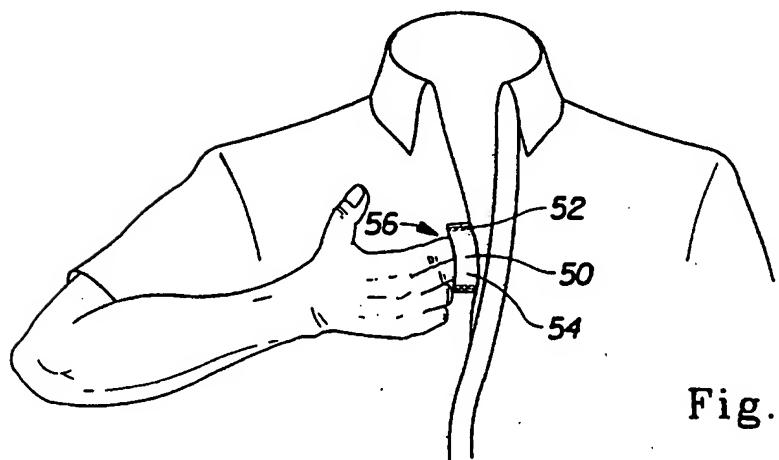


Fig. 7

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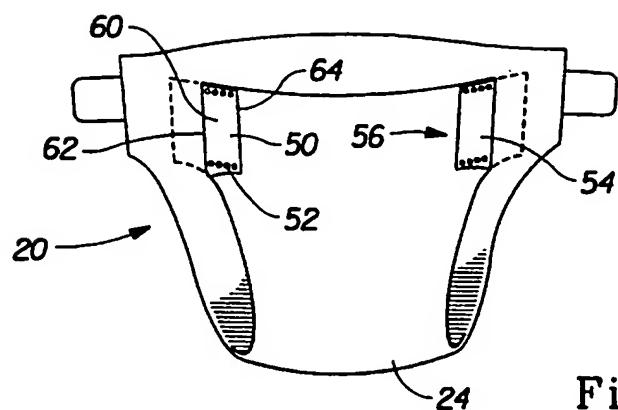


Fig. 8

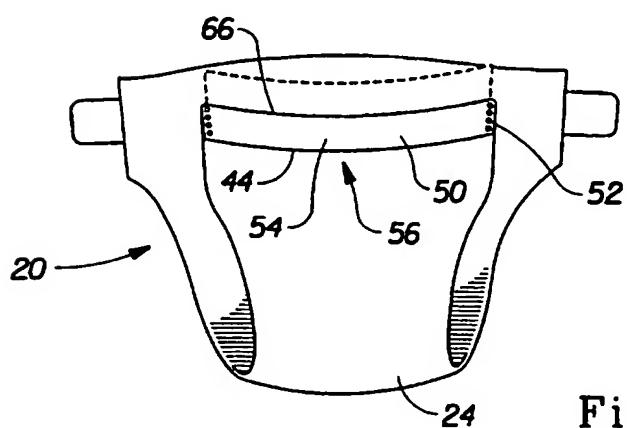


Fig. 9

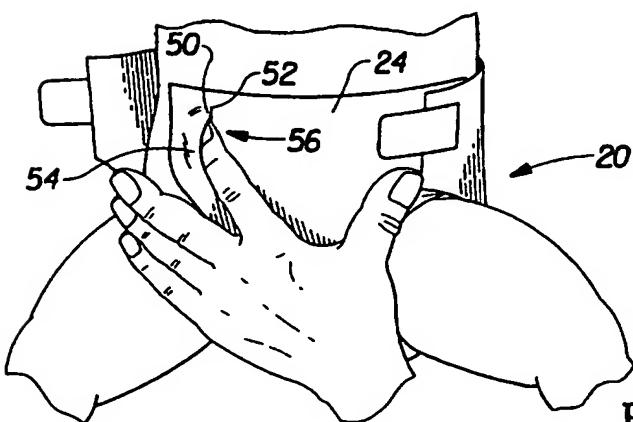


Fig. 10

**INTERNATIONAL SEARCH REPORT**

International Application No  
PCT/US 97/16798

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A61F13/15

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 383 867 A (KLINGER JOAN) 24 January 1995 see page 9, line 55 - line 57; figure 11 ---	1,3,7,8
X	US 2 767 714 A (FRANSEN FRANCES) 23 October 1956 see claims; figures	1,2,7
A	---	9
A	US 4 036 233 A (KOZAK THEODORE FREDRICK) 19 July 1977 see claims 1-3; figures 3,4 ---	1,6,7
A	US 2 548 162 A (KARELS AMANDA O.) 10 April 1951 see claims; figures -----	1,2,7,9

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

17 December 1997

Date of mailing of the international search report

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No  
PCT/US 97/16798

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5383867 A	24-01-95	CA 2124268 A	26-11-94
US 2767714 A	23-10-56	NONE	
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US 2548162 A	10-04-51	NONE	